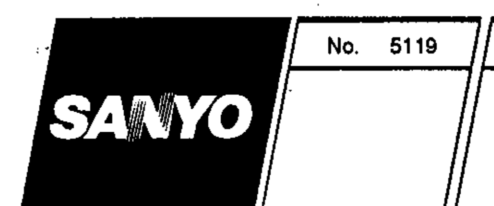
Ordering number : EN 5119

Monolithic Linear IC



LA7449, 7449M

Video Signal Processing IC for VHS VCR Systems

Overview

The LA7449, 7449M is a video signal processing single-chip IC that handles the PAL-G, B and I, 4.43 NTSC, MESECAM and NAP-G, B and I formats. IC internal trimming is used to make the LA7449, 7449M is completely adjustment free, and in combination with a special-purpose CCD (the LC89970, 89970M) it provides a significant reduction in external components, including the glass delay line. Thus the LA7449, 7449M can significantly reduce the signal processing board manufacturing costs. Furthermore, the LA7449, 7449M supports the NAP format (NTSC to PAL conversion) that is poised to become widespread in Europe, China and other markets.

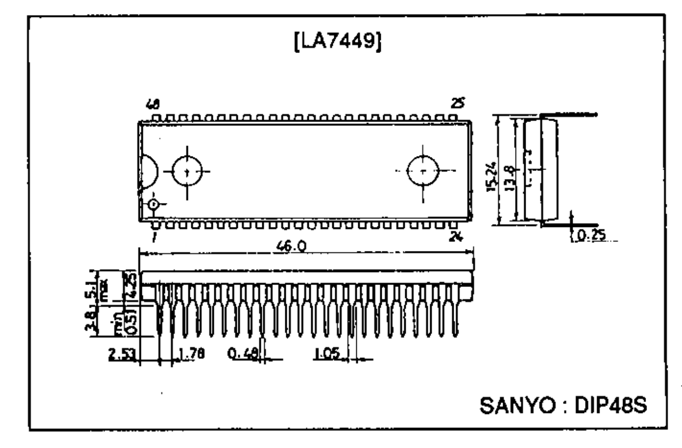
Features

- Completely adjustment free
  The AGC, carrier, deviation, and PB-Y level are adjustment free.
  The YC record current can also be made adjustment free by using the LA7411, 7416 as the head amplifier.
- Support for NAP and PAL color array correction
  Full modulation using a balanced modulator allows playback and conversion to PAL format of NTSC signals recorded on tape.
- Crosstalk exclusion in combination with a special-purpose CCD
  Crosstalk can be excluded without using a glass delay line by combining the LA7449, 7449M with a special-purpose CCD (the LC89970, 89970M).
- Minimal number of external components
  New built-in components:
  — Detail enhancer CR
  — C-trap in the Y low-pass filter
  — Playback C low-pass filter
- High performance and multiple functions
  Linear phase picture controller
  Double high-pass noise canceller, high-speed AFC, DCC
  New built-in functions
  — NAP circuit
  — AVNS (advanced vertical noise suppresor)
  — Automatic QH insertion
  — FM AGC
- Miniature package (48-pin QIP or DIP)

Package Dimensions

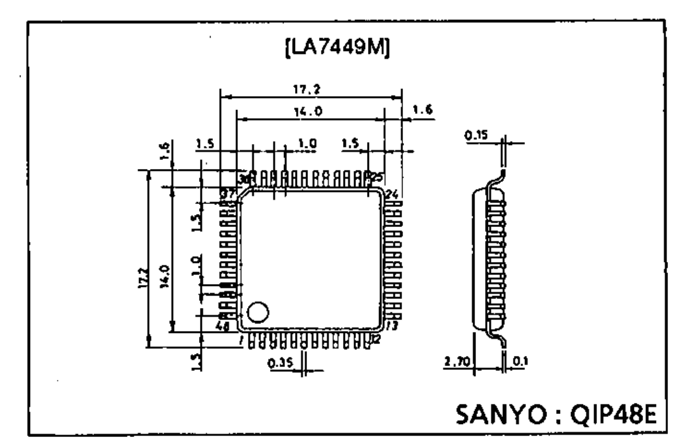
unit: mm

3149-DIP48S



unit: mm

3156-QIP48E



Functions

All VHS format VCR signal processing functions

	Luminance		Chrominance	
R/P	Video amp. Feed back clamp Main LPF YNR (AVNS) VCA Sync separator 4.2 V regulator		4.43 BPF ACC amp. ACC det. Main converter 1.3 M LPF VXO/XO Side lock det. 3rd lock protector	Half H killer BGP generator Killer det. VCO Phase shifter Sub converter 5.06 BPF
REC	Video AGC amp. Video AGC det. Pre LPF Detail enhancer 1/2 f_H carrier shift	NL emphasis Main emphasis White/dark clip FM modulator	Pre amp. Burst emphasis (NTSC) Killer APC det. AFC det.	Burst gate amp.
PB	FM AGC amp. FM AGC det. Double limiter FM demodulator Sub LPF Double high pass noise canceller QV/QH/character insert Main de-emphasis DOC	Drop out det. NL de-emphasis Picture control Y/C mix	Pre amp. Burst de-emphasis (NTSC) PB amp. Killer NAP PAL burst sequence – Compensator Carrier balancer Burst gate amp.	APC det. ID det. DCC Trick det. DPLL

Specifications

Pin numbers are for the LA7449M.

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		7.0	V
Allowable power dissipation	Pd max	Ta ≤ 65°C*	1350*	mW
Operating temperature	Topr		–10 to +65	°C
Storage temperature	Tstg		–40 to +150	°C

Note: * When mounted on a 70 mm by 65 mm, 1.5 mm thickness Bakelite board. The value for the DIP package is 1150 mW.

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		5.0	V
Operating supply voltage	V_{CC} op		4.8 to 5.2	V

Operating Characteristics at Ta = 25°C, V_{CC} = 5.0 V

Parameter	Symbol	Conditions	min	typ	max	Unit
[Record Mode Y System]						
Record mode current drain	I_{CCR}	Input: 1.0 Vp-p video signal	100	130	160	mA
EE output level 1	$V_{EE}1$	Input: 50 Hz system 1.0 Vp-p video signal	1.95	2.05	2.15	Vp-p
AGC characteristics 1	AGC1	Input: 50 Hz system 2.0 Vp-p video signal	2.05	2.15	2.25	Vp-p
AGC characteristics 2	AGC2	Input: 50 Hz system 0.5 Vp-p video signal	1.90	2.00	2.10	Vp-p
AGC characteristics 3	AGC3	Input: 50 Hz system with only SYNC increased 6 dB	555	615	695	mVp-p
AGC characteristics 4	AGC4	Input: 50 Hz system with only SYNC decreased 6 dB	370	410	450	mVp-p
Sync separator output level	V_{SYR}	The SYNC-OUT output pulse wave height	3.9	4.1	4.3	V
Sync separator output pulse width	PW_{SYR}	The SYNC-OUT output pulse width	4.0	4.3	4.6	µs
Sync separator output prerecord delay time	ΔT_{SYR}	The SYNC-OUT delay time	0.9	1.1	1.3	µs
Sync separator threshold level	TH_{SYR}			–20	–15	dB

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Parameter	Symbol	Conditions	min	typ	max	Unit
[Record Mode Y System]						
Pseudo-H insertion level	ΔHD_R	With 2.7 V applied to T14A	–400	–300	–200	mV
White insertion level	ΔWH_R	With 1.3 V applied to T14A	100	250	400	mV
VCA detection voltage	V_{VCA}		3.00	3.20	3.40	V
Record YNR operation EP/LP	$V_{R\text{-}YNR1}$	Input: 50 Hz system standard color bar signal	10	12	14	mVp-p
Y-LPF frequency characteristics 1	YLPF1	The 1 MHz attenuation with respect to 500 kHz	–0.5	0.0	+0.5	dB
Y-LPF frequency characteristics 2	YLPF2	The 2 MHz attenuation with respect to 500 kHz	–1.0	0.0	+1.0	dB
Y-LPF frequency characteristics 3	YLPF3	The 3 MHz attenuation with respect to 500 kHz	–2.5	–0.5	+1.0	dB
Y-LPF frequency characteristics 4	YLPF4	The 4.43 MHz attenuation with respect to 500 kHz			–25	dB
FM modulator output level	V_{FM}	No input	1.0	1.2	1.4	Vp-p
Carrier frequency 1	F_{FM1}	50 Hz system	3.7	3.8	3.9	MHz
FM modulator output 2nd harmonic distortion	H_{MOD}			–40	–35	dB
Deviation 1	DEV1	50 Hz system	0.95	1.00	1.05	MHz
FM modulator linearity	L_{MOD}		–2	0	2	%
1/2 f_H carrier shift	CS		6.5	7.8	9.1	kHz
Emphasis gain	G_{EMP}	Input: 0.5 Vp-p, 10 kHz sine wave	–0.5	0.0	0.5	dB
Detail enhancer characteristics 1	G_{DET1}	Input: 316 mVp-p, 2 MHz sine wave	1.6	1.9	2.6	dB
Detail enhancer characteristics 2	G_{DET2}	Input: 100 mVp-p, 2 MHz sine wave	3.1	4.1	5.1	dB
Detail enhancer characteristics 3	G_{DET3}	Input: 31.6 mVp-p, 2 MHz sine wave	5.3	6.3	7.3	dB
NL emphasis characteristics 1	G_{NLEMP1}	Input: 500 mVp-p, 2 MHz sine wave	0.5	1.4	2.3	dB
NL emphasis characteristics 2	G_{NLEMP2}	Input: 158 mVp-p, 2 MHz sine wave	2.6	3.8	5.2	dB
NL emphasis characteristics 3	G_{NLEMP3}	Input: 50 mVp-p, 2 MHz sine wave	4.9	6.4	7.9	dB
Main emphases characteristics 1	G_{ME1}	Input: 100 mVp-p, 500 kHz sine wave	4.9	5.2	5.5	dB
Main emphases characteristics 2	G_{ME2}	Input: 100 mVp-p, 2 MHz sine wave	13.1	13.6	14.1	dB
White clipping level	L_{WC}	Input: 1.0 Vp-p, white 100% video signal	186	195	204	%
Dark clipping level	L_{DC}	Input: 1.0 Vp-p, white 100% video signal	–55	–50	–45	%
[Playback Mode Y System]						
Playback mode current drain	I_{CCP}		135	160	185	mA
Dropout compensation time	T_{DOC}		0.72	0.85	0.98	ms
DOC loop gain	G_{DOC}	5H later	–1.0	0.0	+1.0	dB
Playback Y level	V_{VOUT}	For playback of an FM signal with a 1.0 MHz deviation	1.95	2.05	2.15	Vp-p
FM demodulator linearity	L_{DEM}	2, 4, 6 MHz	–3.5	0.0	+3.5	%
Demodulation sensitivity	S_{DEM}		0.47	0.52	0.57	V/MHz
Carrier leakage	CL	Input: 4 MHz, 600 mVp-p		–40	–35	dB
Playback YNR characteristics LP/EP	$G_{P\text{-}YNR1}$	Input: 50% white + CW	–2.5			dB
NL de-emphasis characteristics 1	G_{NLDE1}	Input: 158 mVp-p, 2 MHz sine wave	–6.0	–5.0	–4.0	dB
NL de-emphasis characteristics 2	G_{NLDE2}	Input: 50 mVp-p, 2 MHz sine wave	–10.5	–9.0	–7.5	dB
Double noise canceller characteristics 1	G_{WNC1}	Input: 158 mVp-p, 2 MHz sine wave	–1.8	–1.3	–0.8	dB
Double noise canceller characteristics 2	G_{WNC2}	Input: 50 mVp-p, 2 MHz sine wave	–6.2	–5.2	–4.2	dB
Double noise canceller characteristics 3	G_{WNC3}	Input: 15.8 mVp-p, 2 MHz sine wave	–11.7	–10.7	–8.7	dB
PIC-CTL hard response characteristics 1	G_{PH1}	Input: 50% video + sine wave f = 1 MHz, 158 mVp-p	4.5	5.5	6.5	dB
PIC-CTL hard response characteristics 2	G_{PH2}	Input: 50% video + sine wave f = 2 MHz, 158 mVp-p	8.0	9.0	10.0	dB
PIC-CTL soft response characteristics 1	G_{PS1}	Input: 50% video + sine wave f = 1 MHz, 158 mVp-p	–4.5	–3.5	–2.5	dB
PIC-CTL soft response characteristics 2	G_{PS2}	Input: 50% video + sine wave f = 2 MHz, 158 mVp-p	–9.0	–7.0	–5.0	dB
Pseudo-V insertion level (playback)	ΔVD_P	With 5 V applied to T14A	–150	–50	+50	mV
Pseudo-H insertion level (playback)	ΔHD_P	With 2.7 V applied to T14A	–400	–300	–200	mV

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Parameter	Symbol	Conditions	min	typ	max	Unit
[Record Mode Y System]						
White insertion level (playback)	ΔWH_P	With 1.3 V applied to T14A	100	250	400	mV
Sync separator output level	V_{SYP}	The SYNC-OUT output pulse wave height	3.9	4.1	4.3	V
Sync separator output pulse width	PW_{SYP}	The SYNC-OUT output pulse width	4.2	4.5	4.8	µs
Sync separator output pre-record delay time	ΔT_{SYP}		1.4	1.6	1.8	µs
4.2 V regulator voltage	V_{REG}		4.0	4.2	4.4	V
[Record Mode Chrominance System]						
Chrominance low band conversion output burst level	$V_{OR\text{-}38}$	Input: PAL/GBI standard color bar signal, 1 Vp-p	150	190	230	mVp-p
VXO oscillator level 1	$V_{VXO\text{-}R1}$	Input: PAL/GBI standard color bar signal, 1 Vp-p	300	500	700	mVp-p
Record ACC characteristics 1	$ACC_{\text{-}R1}$	With only the chrominance signal level increased 6 dB		+0.2	+0.6	dB
Record ACC characteristics 2	$ACC_{\text{-}R2}$	With only the chrominance signal level decreased 6 dB	–0.5	–0.1		dB
ACC killer on input level	$V_{ACCK\text{-}ON}$			–26		dB
ACC killer on output level	$V_{O\text{-}ACCK}$			–60	–50	dB
ACC killer recovery input level	$V_{ACCK\text{-}OFF}$			–20		dB
VXO control sensitivity	S_{VXO}		1.3	3.2	5.1	Hz/m
APC pull-in range 1	Δf_{APC1}		350			Hz
APC pull-in range 2	Δf_{APC2}				–350	Hz
BGP delay time	t_D	Input: PAL/GBI standard color bar signal, 1 Vp-p	3.1	3.4	3.7	µs
BGP pulse width	t_W		4.7	4.9	5.1	µs
AFC pull-in range 1	Δf_{AFC1}		+1.0	+7.0		kHz
AFC pull-in range 2	Δf_{AFC2}			–3.7	–1.0	kHz
[Playback Mode Chrominance System]						
Video output burst level	$V_{OP\text{-}11}$	SP mode, input: burst 30 mVp-p	255	300	345	mVp-p
Pin 25 output burst level	$V_{OP\text{-}25}$	SP mode, input: burst 30 mVp-p	195	230	265	mVp-p
Playback ACC characteristics 1	$ACC_{\text{-}P1}$	With the chrominance level increased 6 dB		+0.5	+0.8	dB
Playback ACC characteristics 2	$ACC_{\text{-}P2}$	With the chrominance level decreased 6 dB	–0.8	–0.5		dB
Playback killer on input level	$V_{ACK\text{-}P}$		–40	–32	–25	dB
Playback killer on chrominance output level	$V_{OACK\text{-}P}$			–44	–40	dB
Main converter carrier leakage	C_{LP}	The 5.06 MHz carrier leakage component		–40	–33	dB
Burst de-emphasis level NT	G_{BD}	NTSC mode	–5.25	–5.0	–4.75	dB
Playback XO output level 1	$V_{XO\text{-}P1}$		300	450	600	mVp-p
Playback XO oscillator frequency deviation	Δf_{XO}	$\Delta fXO = f - 4.433619$ (MHz)	–9	0	+9	Hz
SLD detector current 1	I_{SLD1}			170		µA
SLD detector current 2	I_{SLD2}			170		µA
NTSC playback burst output level	V_{BNT}	NTSC mode	255	300	345	mVp-p
NTSC to PAL conversion - V axis burst level	VB-NAP		–1.0	0.0	+1.0	dB
NTSC to PAL conversion burst level ratio	ΔB-NAP		–2.0	0.0	+2.0	dB

L7449M Control Pin Table

<table>
<tr><th>Pin No.</th><th colspan="2">Control function</th><th colspan="2">L</th><th colspan="2">M</th><th colspan="2">H</th></tr>
<tr><td>3</td><td>R/P</td><td>Edit</td><td colspan="2"></td><td colspan="2"></td><td colspan="2">3.8 VDC or more</td></tr>
<tr><td>5</td><td>R/P</td><td>YNR (AVNS)-CTL</td><td colspan="2">1.0 VDC to less
YNR-off</td><td colspan="2">1.5 to 2.5 VDC
YNR-CTL</td><td colspan="2">3.5 VDC or more
YNR (strong)</td></tr>
<tr><td rowspan="2">6</td><td>R</td><td>******</td><td colspan="2"></td><td colspan="2"></td><td colspan="2">3.9 VDC or more</td></tr>
<tr><td>P</td><td>N, C, CTL</td><td colspan="2">1.5 VDC or less
N, C-off</td><td colspan="2">2.0 to 3.0 VDC
N, C-CTL</td><td colspan="2"></td></tr>
<tr><td>12</td><td>R/P</td><td>C-rotary</td><td colspan="3">0 to 1.9 VDC
Low CH</td><td colspan="3">2.3 VDC or more
High CH</td></tr>
<tr><td>14</td><td>P</td><td>QV/QH CHARA. INS</td><td>0.8 VDC or less
Through</td><td colspan="2">1.2 to 2.2 VDC
CHARA insert</td><td colspan="2">2.6 to 3.3 VDC
Pedestal insert</td><td>3.7 VDC or more
QV insert</td></tr>
<tr><td>15</td><td>P</td><td>Auto QH INS on</td><td colspan="3">Pull down by 3.9 kΩ</td><td colspan="3"></td></tr>
<tr><td rowspan="2">18</td><td>R/P</td><td>N. L.-on (weak)</td><td colspan="2">0.6 VDC or less
N. L.-off</td><td colspan="2">1.0 to 3.0 VDC
N. L.-on</td><td colspan="2">3.9 VDC or more
N. L.-off</td></tr>
<tr><td>R</td><td>Detail-ENHA</td><td colspan="2">Normal</td><td colspan="2">Weak and f_C down</td><td colspan="2">Normal</td></tr>
<tr><td>22</td><td>R/P</td><td>EP/LP/SP</td><td colspan="2">1.2 VDC or less
SP</td><td colspan="2">2.0 to 2.7 VDC
LP</td><td colspan="2">3.9 VDC or more
EP</td></tr>
<tr><td>23</td><td>R</td><td>SP carrier shift stop</td><td colspan="2"></td><td colspan="2"></td><td colspan="2">3.0 VDC or more
SP carrier shift stop</td></tr>
<tr><td>24</td><td>P</td><td>NAP</td><td colspan="2">1.2 VDC or less
Through</td><td colspan="2">2.0 to 2.7 VDC
Balanced-mod output</td><td colspan="2">3.3 VDC or more
NAP-on</td></tr>
<tr><td>26</td><td>R/P</td><td>NT/MESEC/PAL</td><td colspan="2">1.2 VDC or less
PAL</td><td colspan="2">2.0 to 2.7 VDC
MESEC</td><td colspan="2">3.9 VDC or more
NTSC</td></tr>
<tr><td>29</td><td>P</td><td>Trick</td><td colspan="2"></td><td colspan="2"></td><td colspan="2">3.9 VDC or more</td></tr>
<tr><td>44</td><td>P</td><td>DOC-off</td><td colspan="2"></td><td colspan="2"></td><td colspan="2">4.1 VDC or more</td></tr>
<tr><td>48</td><td>R/P</td><td>PB-H</td><td colspan="2"></td><td colspan="2"></td><td colspan="2">4.0 VDC or more</td></tr>
</table>

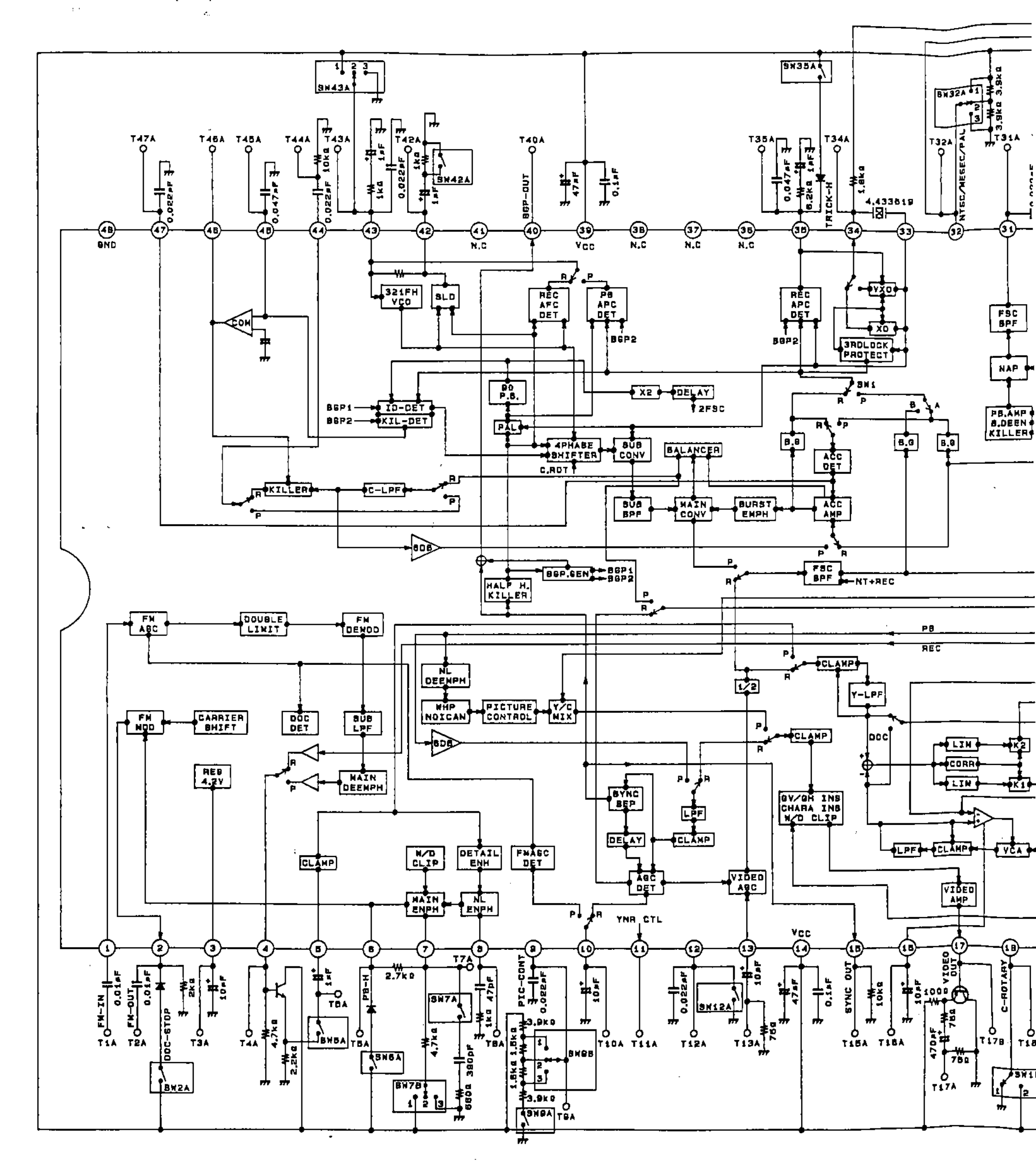
Note: Do not allow pin 3 to fall under 1.5 V. (The chip will enter test mode.)

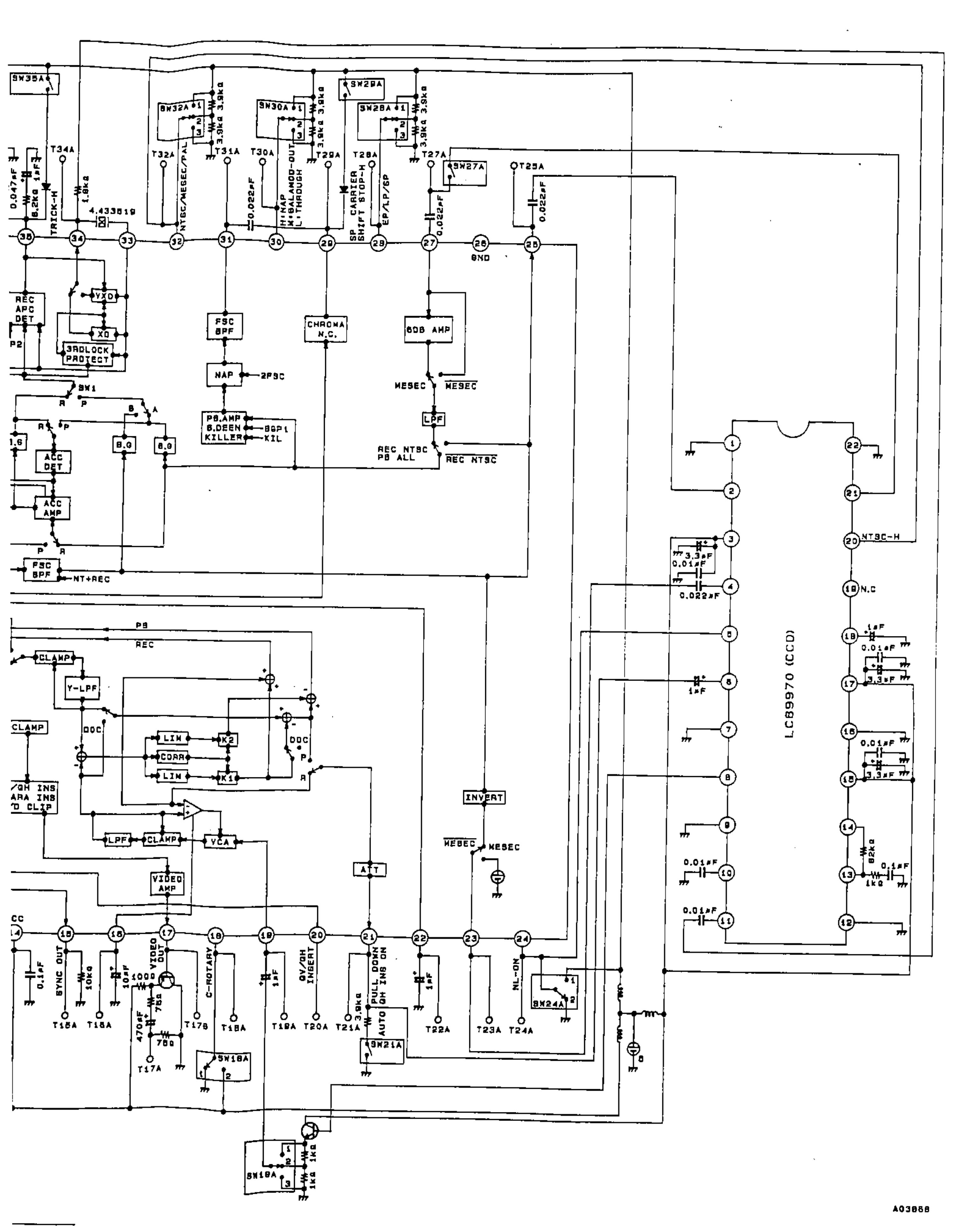
Function Control in each of the LA7449M Operating Modes

		Edit	YNR			NL		Detail enhancer			NC			PIC-CTL	1/2 f_H carrier shift
			Pin 5 control			Pin 18 control		Pin 6 control (with pin 18 control L/H)			Pin 6 control				
			L	M	H	L/H	M	L	M	H	L	M	H		
REC	SP	On	Off	Off	Off	Off	On	Off	Variable	Center	—	—	—	—	O (X)
		Off	Off	Off	Off	Off	On	Off	Variable	Center	—	—	—	—	O (X)
	LP EP	On	Off	K1 = 0.2 K2 = 0.0	K1 = 0.2 K2 = 0.0	On	On	Off	Variable	Center	—	—	—	—	O
		Off	Off	K1 = 0.5 K2 = 0.0	K1 = 0.5 K2 = 0.0	On	On	Off	Variable	Center	—	—	—	—	O
PB	SP	On	K1 = 0.0 K2 = 0.0	K1 = 0.0 K2 = 0.0	K1 = 0.5 K2 = 0.0	Off	On	—	—	—	Off	Variable	Center	Center	—
		Off	K1 = 0.0 K2 = 0.0	K1 = 0.2 K2 = 0.0	K1 = 0.5 K2 = 0.0	Off	On	—	—	—	Off	Variable	Center	O	—
	LP EP	On	K1 = 0.0 K2 = 0.5	K1 = 0.2 K2 = 0.5	K1 = 0.5 K2 = 0.5	On	On	—	—	—	Off	Variable	Center	Center	—
		Off	K1 = 0.0 K2 = 0.5	K1 = 0.2 K2 = 0.5	K1 = 0.5 K2 = 0.5	On	On	—	—	—	Off	Variable	Center	O	—

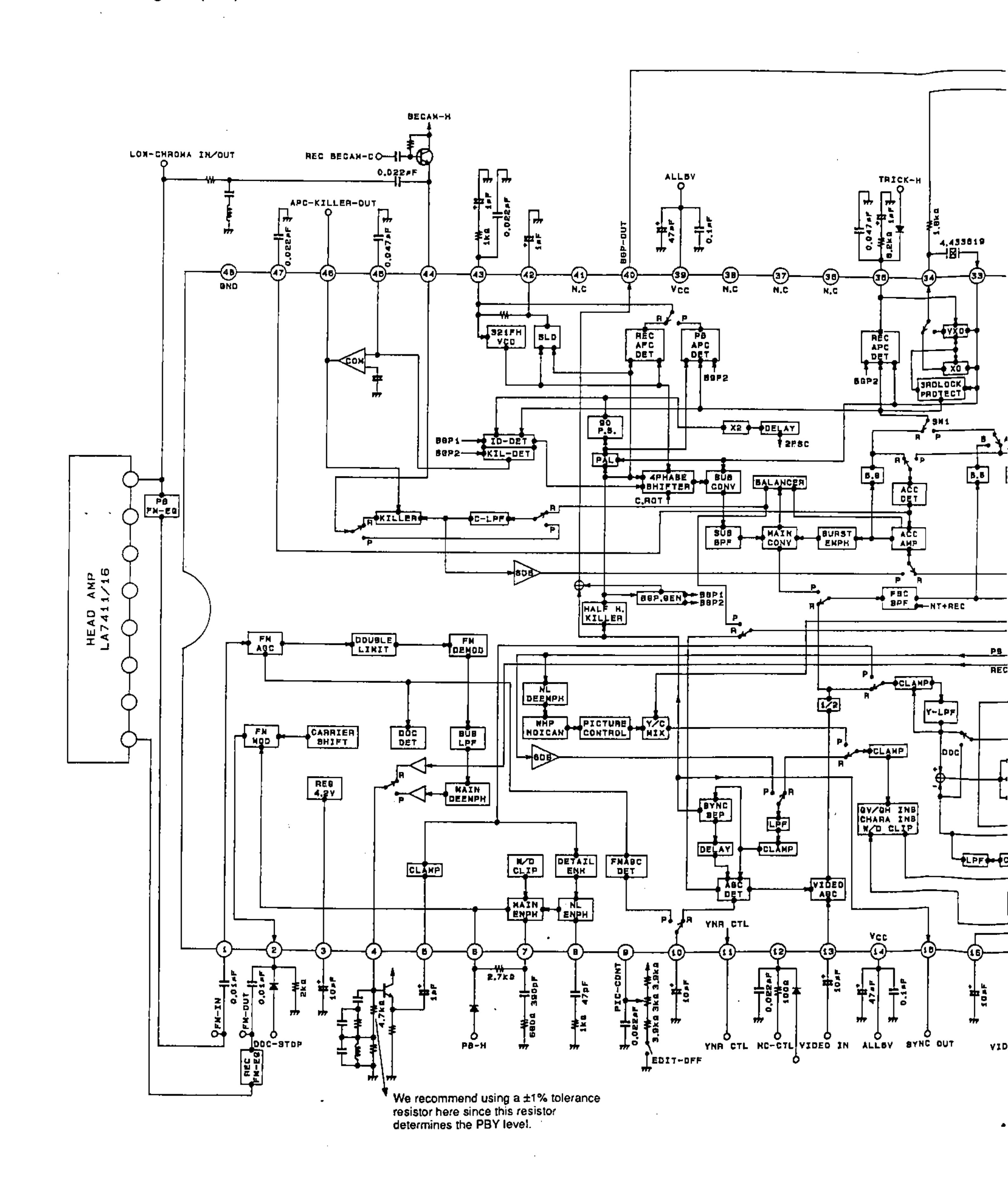
Note: 1. K1 is the YNR coefficient, K2 is the LNC coefficient
2. Use the 1/2 f_H carrier shift entries in parentheses when pin 23 is high.
3. The detail enhancer is off when pin 18 is at the middle level.

LA7449 Test Circuit (DIP)

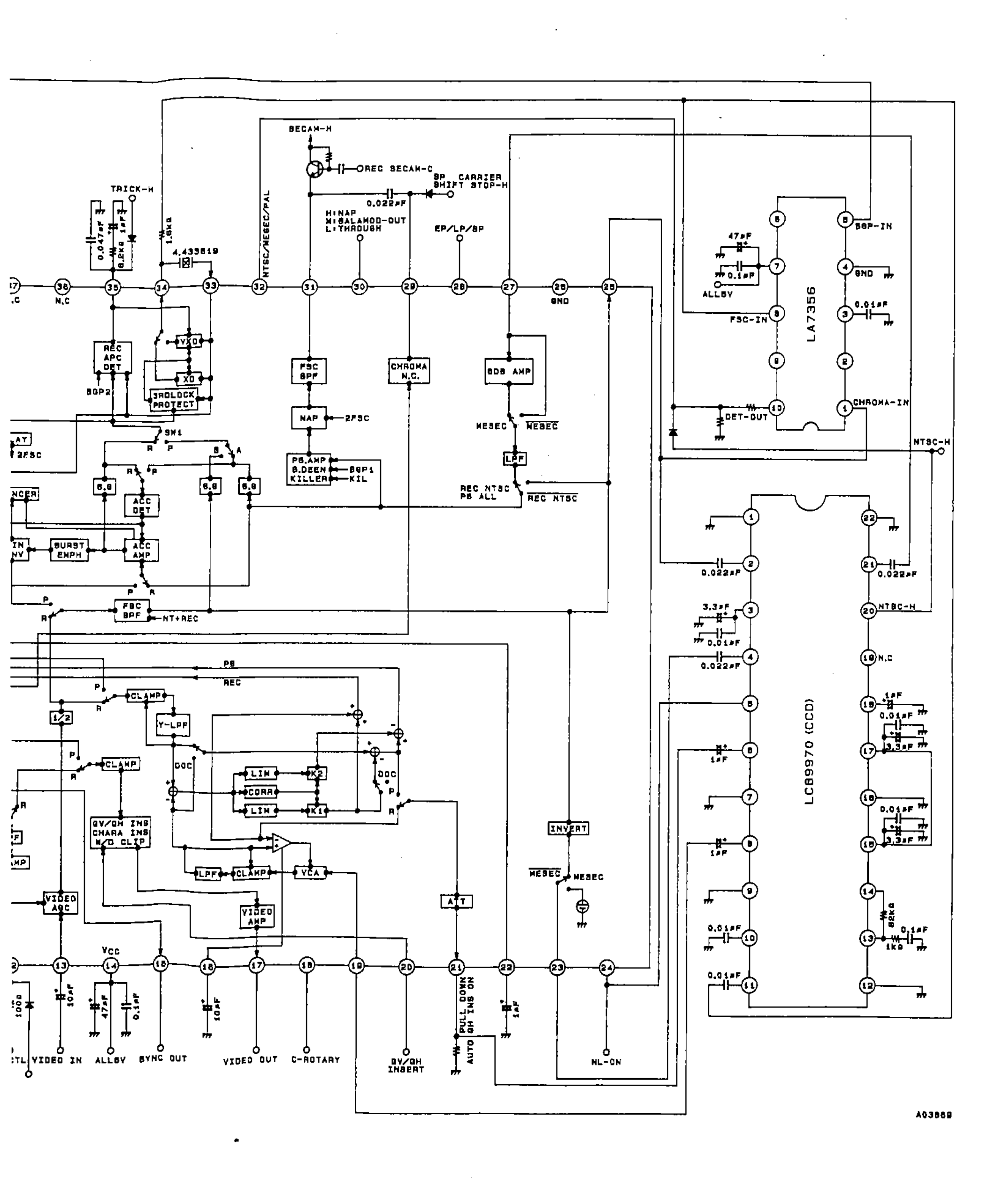



SW35A
SW32A
SW30A
SW29A
SW28A
SW27A
T34A
T32A
T31A
T30A
T29A
T28A
T27A
T25A
TRICK-H
4.433619
NTSC/MESEC/PAL
H:NAP
M:BALANOD-OUT
L:THROUGH
CARRIER SHIFT STOP-H
SP
EP/LP/6P
GND
REC APC DET
YXO
XO
3RDLOCK PROTECT
FSC BPF
NAP
2FSC
PB.AMP
B.DEEN
KILLER
BGP1
KIL
CHROMA N.C.
6DB AMP
MESEC
LPF
REC NTSC
PB ALL
SW1
B.G
ACC DET
ACC AMP
NT+REC
LC89970 (CCD)
NTSC-H
N.C
PB
REC
CLAMP
Y-LPF
DOC
LIM
CORR
K1
K2
GH INS
ARA INS
D CLIP
VCA
VIDEO AMP
INVERT
ATT
SYNC OUT
VIDEO OUT
C-ROTARY
GV/GH INSERT
PULL DOWN
GH INS ON
AUTO
NL-ON
SW24A
SW21A
SW18A
SW19A
T15A
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T17B
T18A
T19A
T20A
T21A
T22A
T23A
T24A
A03868

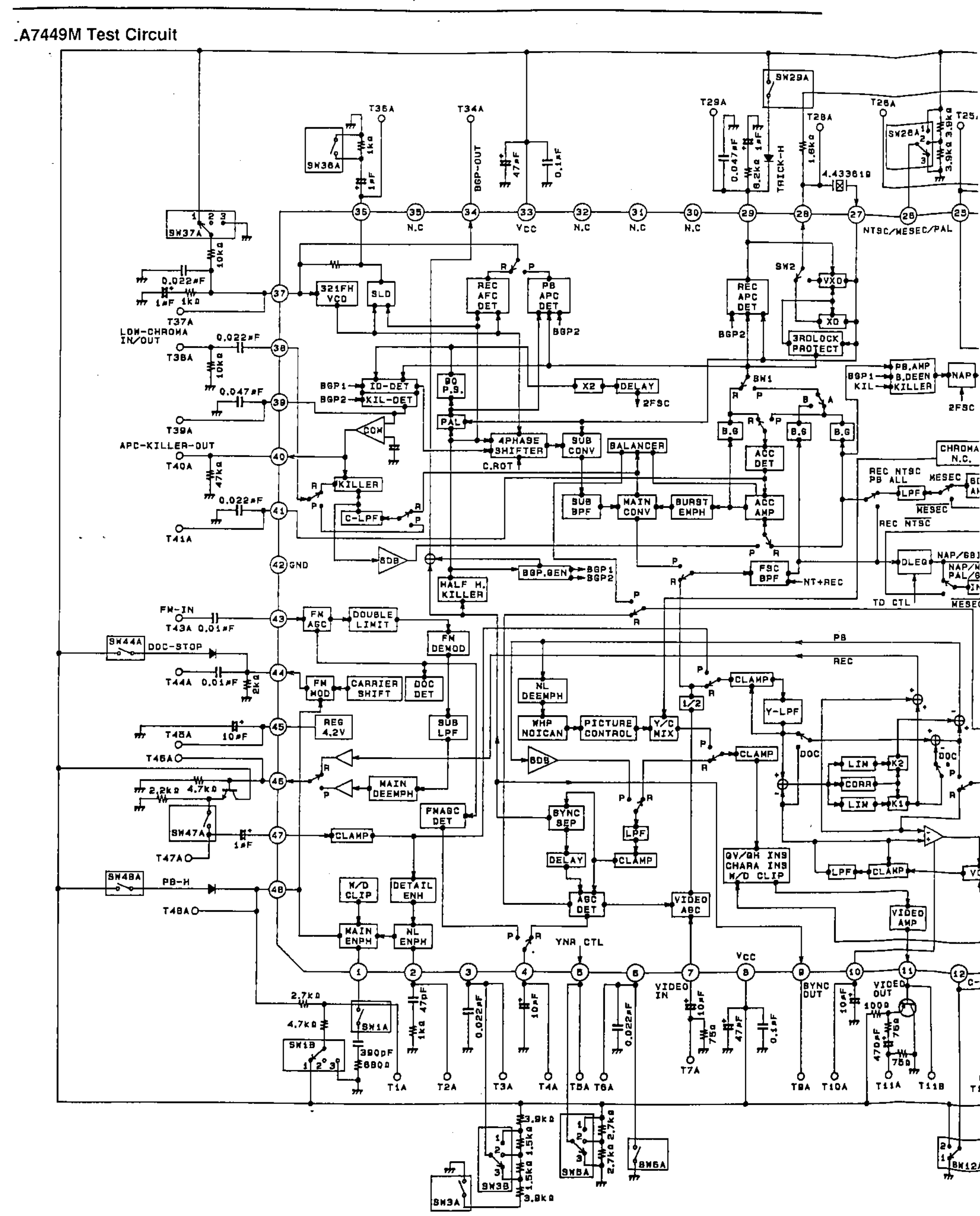
A7449 Block Diagram (DIP)

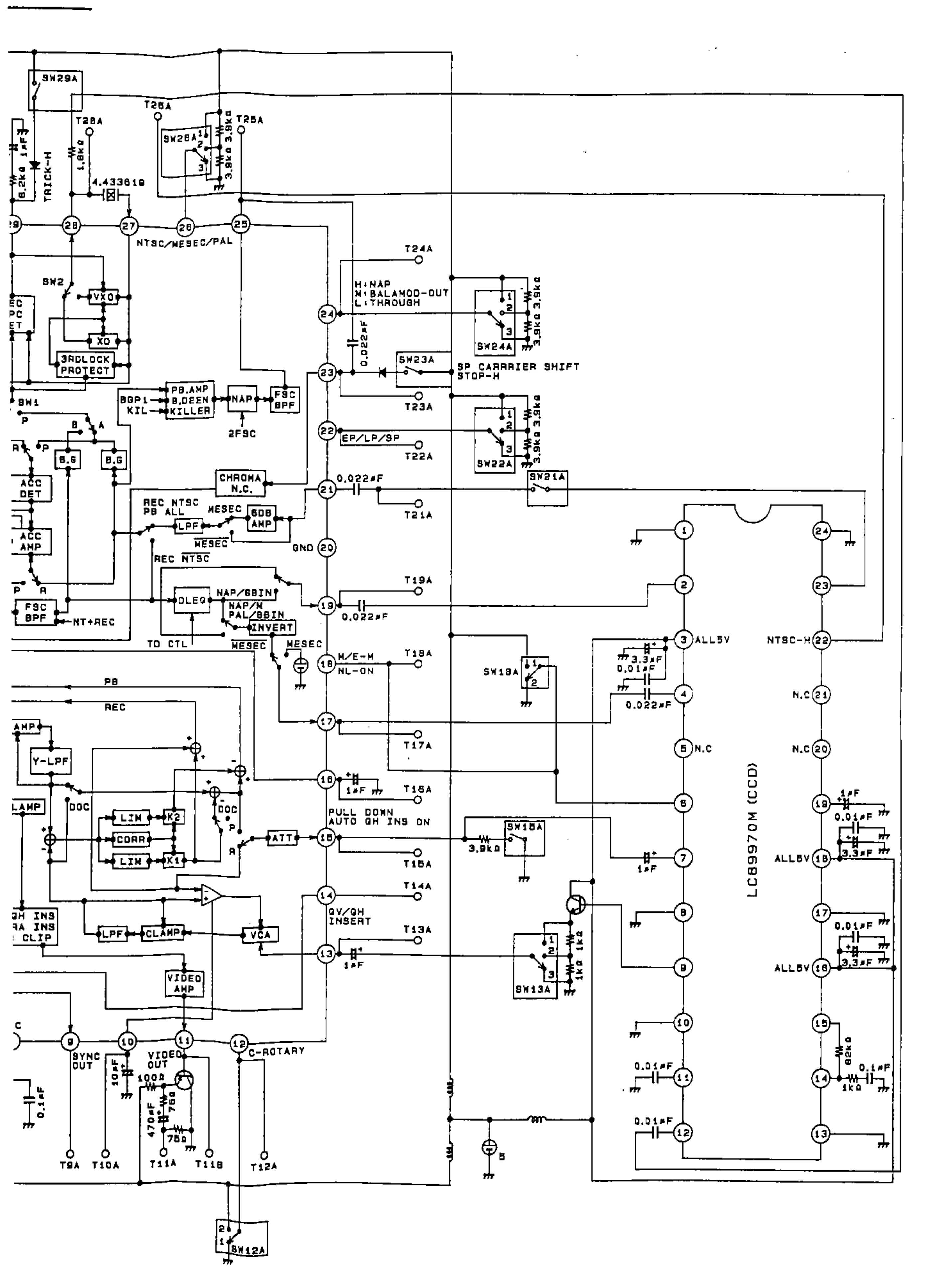


We recommend using a ±1% tolerance resistor here since this resistor determines the PBY level.


BECAM-H
REC SECAM-C
SP CARRIER SHIFT STOP-H
TRICK-H
0.022µF
H:NAP
M:BALAMOD-OUT
L:THROUGH
EP/LP/SP
NTSC/MESEC/PAL
4.433619
1.8kΩ
N.C
GND
REC APC DET
VXO
XO
3RDLOCK PROTECT
BGP2
SW1
2FSC
FSC BPF
NAP
PB.AMP
B.DEEN
KILLER
BGP1
KIL
CHROMA N.C.
SDB AMP
MESEC
LPF
REC NTSC
PB ALL
ACC DET
ACC AMP
BURST EMPH
FSC BPF
NT+REC
PB
REC
CLAMP
Y-LPF
DOC
LIN
CORR
K1
K2
1/2
QV/QH INS
CHARA INS
W/D CLIP
VIDEO AGC
VIDEO AMP
VCA
ATT
INVERT
Vcc
PULL DOWN
AUTO QH INS ON
VIDEO IN
ALL5V
SYNC OUT
VIDEO OUT
C-ROTARY
QV/QH INSERT
NL-ON
LA7356
BGP-IN
GND
FSC-IN
CHROMA-IN
DET-OUT
NTSC-H
LC89970 (CCD)
0.022µF
3.3µF
0.01µF
1µF
47µF
0.1µF
82kΩ
1kΩ
A03869

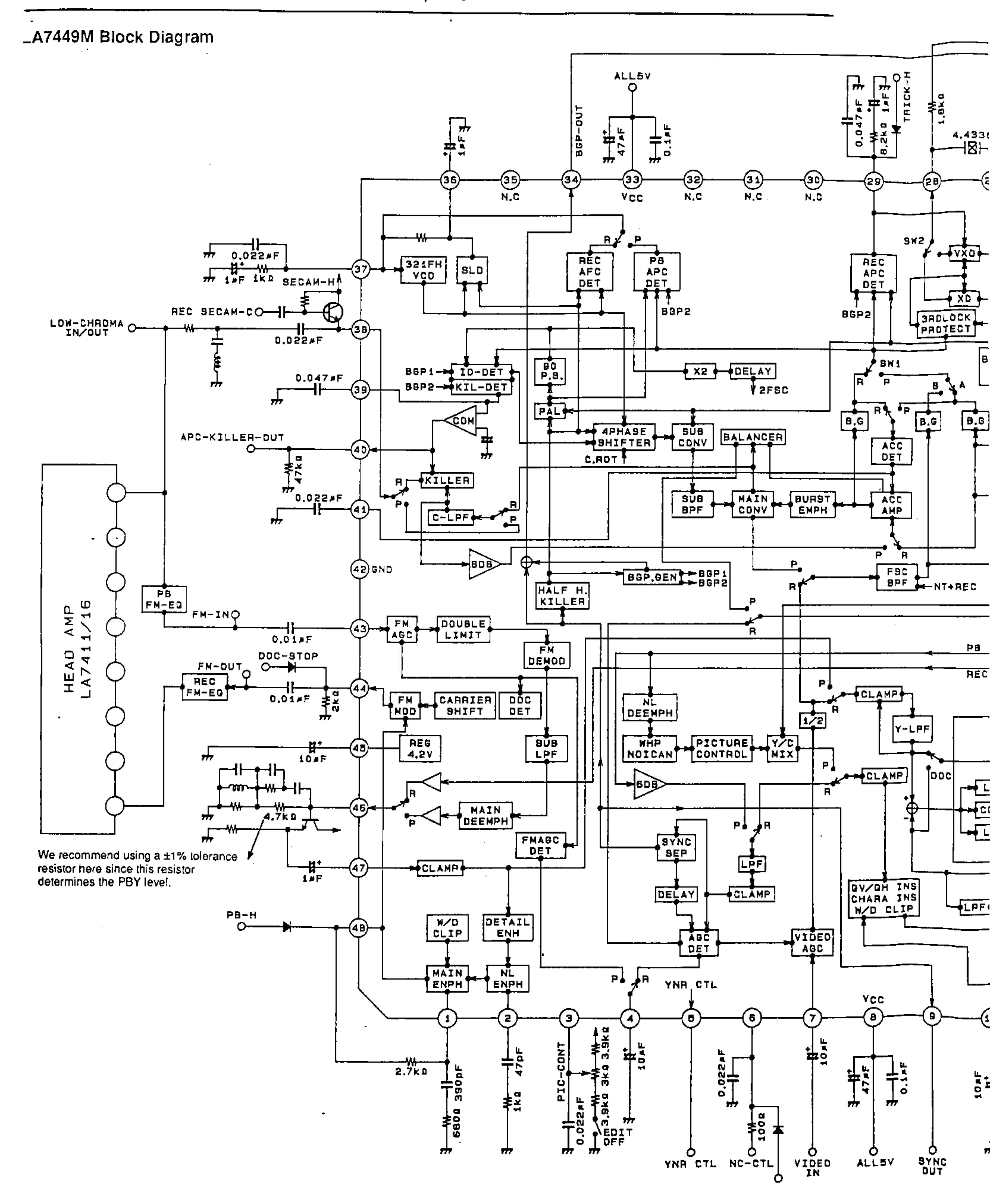
LA7449M Test Circuit



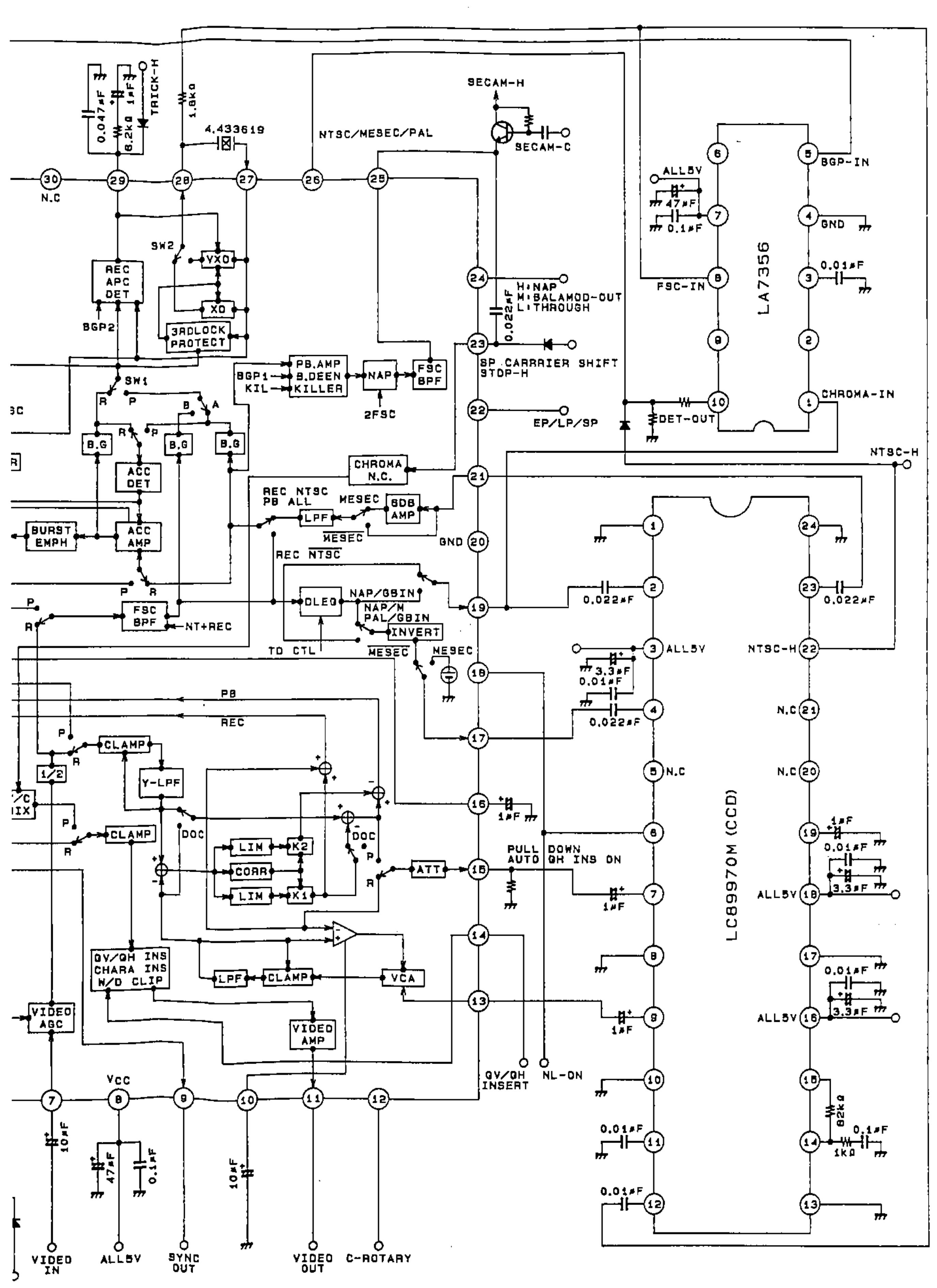


SW29A
TRICK-H
T28A
T26A
T25A
SW26A
4.433619
NTSC/MESEC/PAL
SW2
VXO
XO
3RDLOCK PROTECT
SW1
PB.AMP
B.DEEN
KILLER
NAP
FSC BPF
2FSC
BGP1
KIL
ACC DET
ACC AMP
FSC BPF
NT+REC
CHROMA N.C.
REC NTSC
PB ALL
MESEC
6DB AMP
LPF
DLEQ
NAP/6BIN
NAP/M
PAL/6BIN
INVERT
TO CTL
H:NAP
M:BALAMOD-OUT
L:THROUGH
T24A
SW24A
SW23A
SP CARRIER SHIFT
STOP-H
T23A
EP/LP/SP
T22A
SW22A
SW21A
T21A
GND
T19A
M/E-M
NL-ON
T18A
SW18A
T17A
T16A
PULL DOWN
AUTO GH INS ON
SW15A
T15A
T14A
QV/QH
INSERT
T13A
SW13A
PB
REC
Y-LPF
DOC
LIM
CORR
K1
K2
ATT
LPF
CLAMP
VCA
VIDEO AMP
GH INS
SYNC OUT
VIDEO OUT
C-ROTARY
T9A
T10A
T11A
T11B
T12A
SW12A
LC89970M (CCD)
ALL5V
NTSC-H
N.C
A03870

LA7449M Block Diagram



We recommend using a ±1% tolerance resistor here since this resistor determines the PBY level.


LA7356
LC89970M (CCD)
SECAM-H
SECAM-C
NTSC/MESEC/PAL
4.433619
TRICK-H
N.C
REC APC DET
VXO
XO
3RDLOCK PROTECT
SW1
SW2
BGP2
PB.AMP
B.DEEN
KILLER
BGP1
KIL
NAP
2FSC
FSC BPF
B.G
ACC DET
ACC AMP
BURST EMPH
CHROMA N.C.
REC NTSC PB ALL
MESEC
LPF
6DB AMP
REC NTSC
DLEG
NAP/GBIN
NAP/M PAL/GBIN
INVERT
TO CTL
NT+REC
H:NAP
M:BALAMOD-OUT
L:THROUGH
SP CARRRIER SHIFT STOP-H
EP/LP/SP
GND
BGP-IN
FSC-IN
DET-OUT
CHROMA-IN
NTSC-H
ALL5V
PB
REC
CLAMP
Y-LPF
1/2
DOC
LIM
CORR
K1
K2
ATT
VCA
LPF
QV/QH INS CHARA INS W/D CLIP
VIDEO AGC
VIDEO AMP
PULL DOWN AUTO QH INS ON
QV/QH INSERT
NL-ON
VCC
VIDEO IN
ALL5V
SYNC OUT
VIDEO OUT
C-ROTARY
A03871

This catalog provides information as of June, 1995. Specifications and information herein are subject to change without notice.